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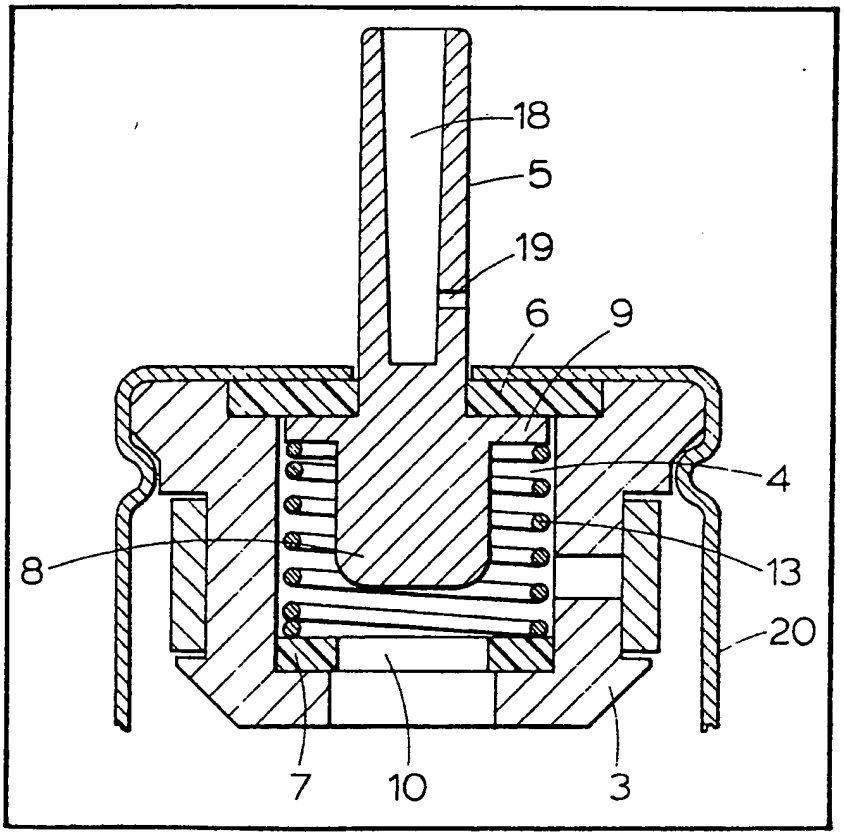
(54) **Aerosol Valve**

(57) A valve for dispensing metered doses from an aerosol container has a ferrule or cap 20 with an internal metering chamber 4 which is fixed with respect to the valve body. A valve member 8 is arranged on the stem 5. The stem 5 has an outlet passage 18 through which a charge can be dispensed from the metering chamber 4 and a transfer port 19 through which the charge can pass from the metering chamber 4 to the outlet passage 18 when the stem 5 is in an operative position. The ferrule or cap 20 has a first valve seal 6 with which the valve stem 5 is a sliding and sealing fit. The transfer port 19 is so disposed that when the stem 5 is in the inoperative position the charge to be dispensed cannot pass through it from the metering chamber 4. The ferrule or cap 20 has a second valve seal 7 with an opening 10 through which material to be dispensed when the stem 5 is in the inoperative position. The opening 10 has an area sufficient not significantly to impede the flow of material so that the material can freely enter or leave the metering chamber 4 under the effect of gravity. The valve member 8 is arranged to enter the opening 10 and make a sealing fit with it during movement of the stem from its inoperative to its operative position and to remain in a sealing fit when the stem reaches its operative position. A return spring 13 surrounds the valve member 8 within the metering chamber 4 and resists movement of the valve stem to its operative position and returns it to its inoperative position.



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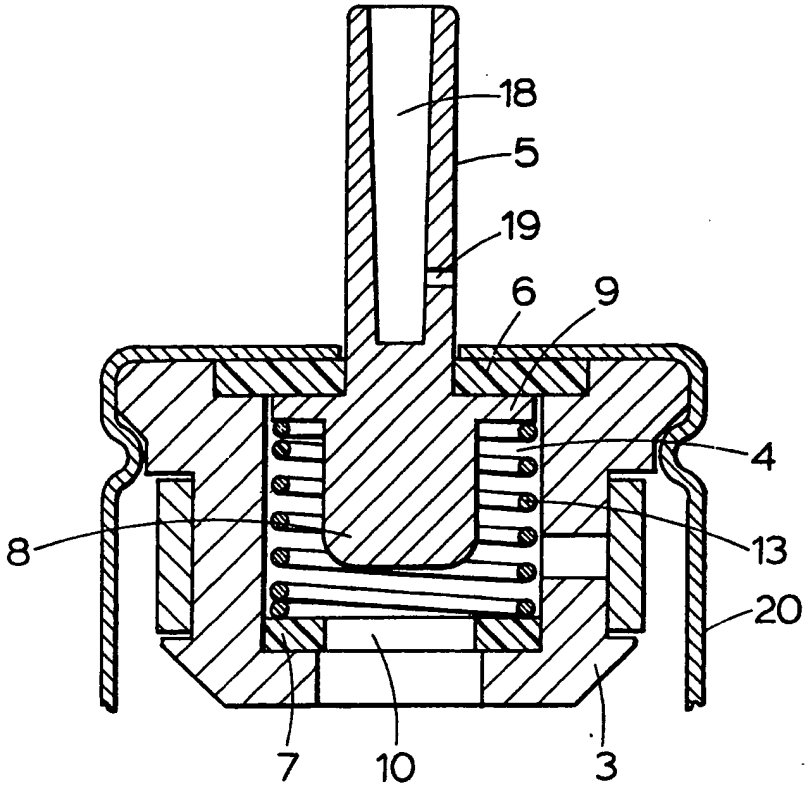
This print embodies corrections made under Section 117(1) of the Patents Act 1977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SPECIFICATION
Aerosol Valve

This invention relates to a dispensing valve with the aid of which a metered dose of the contents of an aerosol container can be dispensed.

Known aerosol dispensers with the metering valve arrangements usually have a metering chamber which is filled with a fresh charge immediately after a charge previously held in the chamber is discharged. Thus each metered dose dispensed has been previously held in the metering chamber and it may be that some such metered doses have been held in the chamber for rather a long time. If the dose is held for a long time there is often some loss of contents from the metering chamber so that the dispenser performs unreliably. Factors which may affect the emptying of metering valves are gravity, temperature and/or vapour pressure changes. It has been found with some such known dispensers that little or no charge will be left in a metering chamber after the dispenser container has been left standing for a prolonged period.

The specification of our co-pending patent application No. 36685/78 describes a way of solving this problem in which a valve for dispensing metered doses from an aerosol container when the container is held in an inverted position, comprises a valve body with an internal metering chamber which is fixed with respect to the valve body; and has a substantially constant volume; a valve stem having a valve member of larger cross-section thereon, an outlet passage through which a charge can be dispensed from the metering chamber and a transfer port through which the charge can pass from the metering chamber to the outlett passage when the stem is disposed in an operative position; a first valve seal with which the valve stem is a sliding and sealing fit, the transfer port being so disposed that when the stem is in the inoperative position the charge to be dispensed cannot pass through it from the metering chamber; a second valve seal having an opening through which material to be dispensed can pass when the stem is in the inoperative position the valve member being arranged to enter the said opening and make a sealing fit therein during movement of the stem from its inoperative to its operative position and to remain in a sealing fit when the stem reaches its operative position; and the said opening having an area such that when the valve stem is in the inoperative position and the valve member is disengaged from the opening the said material can freely enter or leave the metering chamber under the effect of gravity without the flow of material being significantly impeded, a guide portion extending through an extension of the valve body and connected to the valve stem by a neck or constriction extending through the opening when the valve is in its inoperative position, and a return spring surrounding the guide portion within the extension and bearing between an abutment on the guide portion of the valve stem and another abutment in the extension thereby to resist movement of the valve stem to its operative position.

The present invention provides a modification of this valve in which the valve member is completely disengaged from the opening in the second valve seal when the valve stem is in an inoperative position and in which the return spring surrounds the valve member within the metering chamber and resists movement of the valve member to an operative position. In this modified valve, the contents of the container can, when the container is inverted, flow freely into the metering chamber through the opening in the second valve seal and any gas or vapour that may be in the metering chamber freely exit from the chamber through the same opening. An embodiment of the invention is illustrated in the accompanying drawing which is a sectional diagram of a dispensing and metering valve.

In the arrangement illustrated, a metering valve is fitted in a ferrule or cap of an aerosol container. The container contains a material to be dispensed in a volatile liquid propellant. When the device is not being used, the container may be placed with the valve uppermost. This is with the various parts of the valve in the position shown in the drawing. When the device is in use, the container is inverted from this position.

The valve comprises a ferrule or cap 20 fitted to a container. A valve bush 3 fits in the ferrule or cap 20 and defines a metering chamber 4 which is fixed with respect to the ferrule or cap and has a constant volume. A valve stem 5 extends into the chamber 4. A first valve seal 6 is provided at the top of the bush 3 and a second valve seal 7 is provided immediately below the bottom of the bush. The first valve seal 6 has an opening in which the valve stem 5 makes a sealing fit, and through which the valve stem can slide.

The valve stem 5 carries a valve member 8 having an upper shoulder 9 which can make sealing contact with the underside of the first or upper valve seal 6 as shown in the drawing. The valve member 8 has a diameter such that when the valve stem is moved downwards from the inoperative position shown in the drawing, it will enter an opening 10 in the second or lower valve seal 7 and will engage the periphery of that opening sufficiently to provide a seal. When the stem 5 is in the inoperative position shown and the container is inverted, the contents of the container can flow freely through the opening 10 into the metering chamber 4 because the opening is completely open. When the container is returned to the position of rest as shown in the drawing, the contents of the metering chamber 4 drain freely back to the interior of the container by the same route. The opening 10 is of such a size that the flow of material into or out of the metering chamber 4 will not be significantly impeded. Thus, the filling and emptying of this chamber 4 is almost instantaneous. By way of

example, the opening 10 may have a diameter of four millimetres.

The valve stem 5 is urged to the inoperative position shown in the drawings by a coil spring 13 surrounding the valve member 8. The spring 13 is located within the metering chamber 4 and bears between the seal 7 and the shoulder 9 of the valve member 8, so as to resist movement of the valve member away from the seal 6.

The valve stem 5 has an outlet passage 18 through which a charge can be dispensed from the metering chamber 4 such charge entering the outlet passage 18 through a transfer port 19 when the valve stem has been moved to an operative position.

When the device is in use, the can is inverted and the contents of the can will then run into the metering chamber 4. Any gas in the metering chamber 4 can easily escape through the opening 10. When the valve stem 5 is depressed the valve member 8 will enter the opening 10 thereby to close the opening 10 so that no more of the contents of the aerosol can enter the metering chamber. Thus, a dose is metered. Continued depression of the valve stem will move the transfer port into the metering chamber 4 while the valve member 8 still remains as a sealing fit in the opening 10. Thus, the metered dose can exit through the transfer port 19 and the outlet passage 18.

Claims

1. A valve for dispensing metered doses from an aerosol container when the container is held in an inverted position, the said valve comprising a valve body with an internal metering chamber which is fixed with respect to the valve body; and has a substantially constant volume; a valve stem having a valve member of larger cross-section thereon, an outlet passage through which a charge can be dispensed from the metering chamber and a transfer port through which the charge can pass from the metering chamber to the outlet passage when the stem is disposed in an operative position; a first valve seal with which the valve stem is a sliding and sealing fit, the transfer port being so disposed that when the stem is in the inoperative position the charge to be dispensed cannot pass through it from the metering chamber; a second valve seal having an opening through which material to be dispensed can pass when the stem is in the inoperative position, the valve member being arranged to enter the said opening and make a sealing fit therein during movement of the stem from its inoperative to its operative position, to remain in a sealing fit when the stem reaches its operative position but to be completely disengaged from the opening when the stem is in the inoperative position and the said opening having an area such that when the valve stem is in the inoperative position and the valve member is disengaged from the opening the said material can freely enter or leave the metering chamber under the effect of gravity without the flow of material being significantly impeded, and a return spring surrounding the valve member within the metering chamber and arranged to resist movement of the the valve stem to its operative position.

2. An aerosol container having valve for dispensing metered doses as claimed in Claim 1.

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